

- (b) (i) How the humming sound or line frequency noise of 50Hz is filtered out? Design and implement active filter for the same. 5
- (ii) What do you understand by precision rectifier? Explain the working of half wave precision rectifier. 5
- (c) Explain the working of dual slope integrating ADC with the help of circuit diagram. 10

5 Attempt any two parts :

- (a) Find expression for  $V_o$  in figure 5.1(a). 10

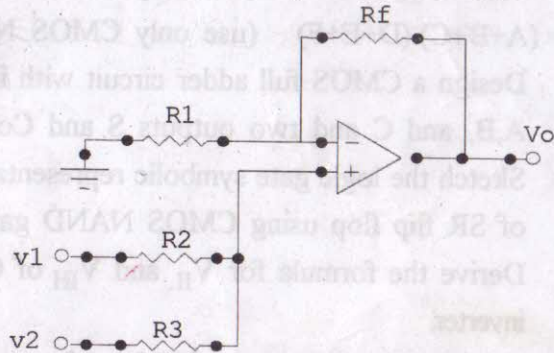


Fig. 5.1(a)

- (b) Design a 2<sup>nd</sup> order Butterworth high pass filter with overall pass band gain of 3 having corner frequency 2kHz. Also find and plot the frequency response at 100Hz, 500Hz, 1000Hz, 1500Hz, 2000Hz, and 5000Hz. 10
- (c) Design a wide bandpass filter with  $f_L = 500\text{Hz}$  and  $f_H = 1500\text{Hz}$  and pass band gain of 5, draw frequency response of the filter and find value of Q? 10



(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 131501

Roll No.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

**B. Tech.**

(SEM. V) (ODD SEM.) THEORY  
EXAMINATION, 2014-15  
INTEGRATED CIRCUIT

Time : 3 Hours]

[Total Marks : 100

Note:

1. Attempt all questions.
2. All questions carry marks as shown against them

1

- Attempt any four parts :
- (a) Explain the working of Basic MOSFET current source and current steering circuits. 5
- (b) Discuss Wilson current mirror and Widlar current source. What are the advantages of Widlar current source over Wilson current mirror? 5
- (c) Draw the frequency response of IC 741. Give the upper and lower 3dB frequency of same. 5
- (d) Define input offset current and input bias current. What is CMRR and virtual ground? 5



(e) Consider a IC 741 having unity gain bandwidth of 1MHz. What maximum gain you can get for an audio amplifier from same IC? 5

(f) Draw the circuit for anti-log amplifier and derive the expression. 5

2 Attempt any four parts :

(a) Draw a 4 bit binary weighted D/A converter, find the value of step size if  $R=10K$  and  $R_f=1.2K$ . What is the output voltage when all binary inputs are at 5V? 5

(b) Design and implement an inverting Schmitt trigger for use as a zero crossing detector with saturation voltages of  $\pm 15V$ , having hysteresis transition of  $\pm 25mV$ . 5

(c) Design and implement a free running astable multivibrator using timer 555 with free running frequency of 5kHz having duty cycle of 30%. 5

(d) Determine the free running frequency  $f_{out}$  and the lock range  $f_L$ , and the capture range  $f_C$  for PLL 565 having  $R_1=12K$ ,  $C_1=0.001\mu F$ ,  $C_2=10\mu F$ ,  $C_3=0.001\mu F$ ,  $V_{cc}=\pm 10V$ ? Show the graphical representation between lock frequency, capture frequency and free running frequency. 5

(e) A monostable multivibrator is to be used as divide-by-4 network. The frequency of input trigger is 12 kHz. If the value of  $C = 0.05\mu F$ , what should be value of R? 5

(f) Draw the circuit of KHN filter and derive the expression for its voltage gain. 5

3 Attempt any four parts :

(a) Sketch a CMOS logic circuit that realizes the function : 5

$$F_1 = ABC + DEF \quad (\text{use only CMOS NOR gate})$$

$$F_2 = (A+B+C).(D+E+F) \quad (\text{use only CMOS NAND gate})$$

(b) Design a CMOS full adder circuit with inputs A, B, and C and two outputs S and Co. 5

(c) Sketch the logic gate symbolic representation of SR flip flop using CMOS NAND gates. 5

(d) Derive the formula for  $V_{IL}$  and  $V_{IH}$  of CMOS inverter. 5

(e) Explain the application of PLL as frequency multiplier with suitable circuit diagram. 5

(f) Explain the types of phase detectors with suitable circuit diagrams and input-output waveforms. 5

4 Attempt any two parts :

(a) Explain the generation of square and triangular waveforms from astable multivibrator operation using op amp . Also find expression of the time period for both cases. 10